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Suyama et al.

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(54) **LIQUID CRYSTAL OPTICAL DEVICE**

FOREIGN PATENT DOCUMENTS

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(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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(56) **References Cited**

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(57) **ABSTRACT**

An optical device includes a transparent layer having a desired curved surface configuration, a layer including a variable refractive index material having a dielectric constant anisotropy, at least two transparent electrodes arranged to sandwich the transparent material layer and the variable refractive index material, and a driving device supplying a voltage including driving frequencies f_1 and f_2 between the transparent electrodes. The difference $\Delta\epsilon$ in the dielectric constant of the variable refractive index material due to the anisotropy is positive at one of the driving frequencies and negative at the driving frequency.

20 Claims, 67 Drawing Sheets

